

<b>TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED / ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371</b>		ATTORNEY'S DOCKET NUMBER <b>P66680US0</b>
		US APPLICATION NO. (If known, see 37 CFR 1.51) <b>097831377</b>
INTERNATIONAL APPLICATION NO. <b>PCT/EP99/08664</b>	INTERNATIONAL FILING DATE <b>11 November 1999</b>	PRIORITY DATE CLAIMED <b>17 November 1998</b>
TITLE OF INVENTION <b>USE OF ZINC ALLOYS</b>		
APPLICANT(S) FOR DO/EO/US <b>Michael KNEPPER, Jochen SPRIESTERSBACH, Andrea WINKELS and Juergen WISNIEWSKI</b>		

**Applicant herein submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.**

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
  - ☒ A proper Demand for Internatl. Preliminary Examination was made by the 19th month from earliest claimed priority date.
  - ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
    - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
    - b. ☒ has been transmitted by the International Bureau.
    - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
  - ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the Internatl. Preliminary Examination report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11. to 16. below concern other document(s) or information included:**

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
  - ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

First Page of Publication

Translation of the amended claim filed on December 8, 2000

US APPLICATION NO. (If known, see 37 CFR 1.5) <div style="font-size: 1.5em; font-weight: bold;">09/831377</div>		INTERNATIONAL APPLICATION NO. <div style="font-weight: bold;">PCT/EP99/08664</div>		ATTORNEY'S DOCKET NUMBER <div style="font-weight: bold;">P66680US0</div>	
17. <input checked="" type="checkbox"/> The following fees are submitted:  <b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b> Internatl. prelim. examination fee paid to USPTO (37 CFR 1.492 (a) (1)) .. \$690.00 No international preliminary examination fee paid to USPTO (37 CFR 1.492 (a) (2)) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) .. \$710.00 Neither international preliminary examination fee (37 CFR 1.492 (a) (3)) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO) ..... <b>\$1000.00</b> International preliminary examination fee paid to USPTO (37 CFR 1.492 (a) (4)) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$100.00 Search Report prepared by the EPO or JPO (37 CFR 1.492 (a) (5)) ..... <b>\$860.00</b> <div style="text-align: right;"><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b></div>				CALCULATIONS	PTO USE ONLY
				\$ 860.00	
Surcharge of \$130.00 for furnishing the <b>oath or declaration</b> later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ 130.00	
<b>Claims</b>	<b>Number Filed</b>	<b>Number Extra</b>	<b>Rate</b>		
Total Claims	1 - 20 =	-0-	x \$18.00	\$	
Independent Claims	1 - 3 =	-0-	x \$80.00	\$	
Multiple Dependent Claim(s) (if applicable)			+ \$270.00	\$	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$ 990.00	
Reduction by 1/2 for filing by <b>small entity</b> , if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				\$	
<b>SUBTOTAL =</b>				\$ 990.00	
Processing fee of \$130 for furnishing the <b>English translation</b> later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f))				\$	
<b>TOTAL NATIONAL FEE =</b>				\$ 990.00	
Fee of \$40.00 for recording the enclosed <b>assignment</b> (37 CFR 1.21(h)). Assignment must be accompanied by appropriate cover sheet (37 CFR 3.28, 3.31).				\$	
<b>TOTAL FEES ENCLOSED =</b>				\$ 990.00	
				Amt. to be refunded:	\$
				Amt. charged:	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>990.00</u> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. <u>06-1358</u> in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge my account any additional fees set forth in §1.492 during the pendency of this application, or credit any overpayment to Deposit Account No. <u>06-1358</u> . A duplicate copy of this sheet is enclosed.					
SEND ALL CORRESPONDENCE TO:  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>JACOBSON HOLMAN PLLC</b>            400 7th Street, N.W., Suite 600            Washington, DC 20004            202-638-6666  <b>CUSTOMER NUMBER: 00136</b> </div> <div style="width: 45%; text-align: right;">           By             William E. Player            Reg. No. 31,409         </div> </div>					

SMB

### Use of Zinc Alloys

The present invention relates to the use of zinc alloys as constructional zinc for strips and plates.

To date, strips and plates of alloyed zinc for building purposes have contained, in addition to zinc with a content of 99.99%, from 0.005 to 0.05% by weight of aluminum as well as additions of from 0.05 to 0.2% by weight of titanium and copper. This alloy is described, for example, in DE 17 58 498 and meets the standard DIN 17 770, part 1.

The preparation of this material is generally performed using the casting-and-rolling process in which strips are prepared in a predetermined thickness by a continuous procedure (melting - casting - rolling - winding), which strips are subsequently cut into narrow strips or plates on shear lines.

This material is highly stable in the atmosphere. Its surface first reacts with atmospheric oxygen to form zinc oxide. Then, by the action of water, zinc hydroxide is formed which is converted to a dense, firmly adhering and water-insoluble coat layer of basic zinc carbonate by reaction with atmospheric carbon dioxide. This protective layer is also responsible for the high corrosion resistance of such strips and plates.

In contrast to the behavior of the surface of zinc facing the free atmosphere, other conditions prevail on the lower side of the zinc strips and plates, i.e., on the side facing away from weathering influences. If the lower side of the zinc strips and plates is additionally exposed to moisture or condensed water for an extended period of time due to poor aeration and deaeration, enhanced corrosion must be

expected due to such mistakes of building physics and laying technology. Such water inclusions, water irruptions and condensation water eventually lead to punctual deep corrosion (pinholing) which can spread two-dimensionally.

To avoid these consequences, care has to be taken that sufficient aeration and deaeration of the base construction of zinc strip or plate coatings is provided by observing the prescriptions and regulations of the VOB and DIN standards as well as technical rules of the art and decrees of the building authorities.

Due to increased ecological demands on the resistance of these materials, it has been desired to develop materials having comparable mechanical properties, but with clearly more beneficial corrosion properties. The strips and plates previously used as constructional zinc lose 4 to 5  $\mu\text{m}$  per year.

Such an improved material has been described in DE-A-195 45 487 and is characterized by a copper content of from 0.02 to 0.075% by weight and a manganese content of from 0.075 to 0.75% by weight. However, tests made on this material have shown that the demands made on such a material in practice are still far from being met, despite the considerable improvements.

From DD-4822, the use of zinc-aluminum alloys is known which contain from 1 to 63% of aluminum and from 99 to 37% of zinc and which are rendered suitable for objects having a high deformability, i.e., so-called superplastic behavior, by a special heat treatment. This is important to the drawing of wires and to the rolling, extruding, forging, deep-drawing of sheets, and to bending. There are no indications to the corrosion behavior of these alloys and thus their usability as constructional zinc for strips and plates.

DE 30 07 850 C describes the use of a zinc alloy as a powder for mechanical plating. In addition to improved corrosion resistance, above all, a perfect adhesion of the coating to the substrate is to be achieved. Thus, this is again a different use from that of such alloys as constructional zinc for beams and plates.

DE 914 785 describes a bearing alloy made of zinc, aluminum and other components in which the content of copper and/or manganese is to be about 1%. These alloys can be used as bearing and kneading alloys. These functions are completely different from the use of zinc alloys as constructional zinc for strips and plates.

The object to provide strips and plates of alloyed zinc for use as constructional zinc which meet even higher demands is now achieved, above all, by adjusting the aluminum content to from 5 to 35% by weight, preferably from 5 to 20% by weight, especially from 8 to 15% by weight. Further improvements are achieved by co-alloying from 0.002 to 0.04% by weight of indium and/or from 0.002 to 0.04% by weight of calcium and/or from 0.002 to 0.4% by weight of titanium and/or from 0.05 to 0.8% by weight of manganese. Copper, iron and lead should be contained therein only in such amounts as are unavoidable as impurities of zinc and aluminum. Further improvements of the properties are possible with from 3 to 100 ppm of boron, from 3 to 100 ppm of carbon, from 3 to 50 ppm of magnesium, from 2 to 500 ppm of vanadium, from 2 to 500 ppm of silicon and/or from 2 to 500 ppm of nickel.

The improved properties of the alloys used according to the invention can be seen from comparative corrosion studies with the salt spraying test according to DIN 500 21- ss (storing for 7 or 14 days), and with the condensed water/SO<sub>2</sub> test according to DIN 50 018 KFW 0.2s (storage for 22 cycles). After the storage, the mass changes and the optical appearance of the corrosion of the sheets are established.

It was found that the plates and strips according to the invention exhibit a clearly improved corrosion resistance in the salt spraying test as compared to the previously used fine zinc alloys, which is manifested by a corrosion rate which is reduced by one power of ten. In the condensed water/SO<sub>2</sub> test according to DIN 50 018 KFW 0.2s, there was also found a clearly improved corrosion resistance as compared to the previously used fine zinc alloys.

Comparative studies in the salt spraying test according to DIN 50 021-ss in comparison with fine zinc alloys I and II in DE-A-195 45 487 have shown that the

mass loss can be reduced by at least another 80%. In the SO<sub>2</sub> test according to DIN 50 018 KFW 0.2s, the mass loss decreases by at least another 70% as compared to these alloys.

It is of particular importance that the risk of punctual deep corrosion as a consequence of mistakes of building physics and/or unprofessional laying is clearly reduced in the alloys according to the invention, and that the loss of metal can be minimized. Thus, the import of leached-out metals into the environment is also clearly reduced. This is demanded, for example, by the Dutch authorities.

The preferably co-alloyed elements indium, calcium, titanium and manganese have an influence, above all, on the mechanical properties, but they additionally improve the corrosion behavior.

Particularly good results are achieved with alloys having an aluminum content of from 5 to 20% by weight of aluminum, the range of from 8 to 15% by weight of aluminum being particularly preferred.

Impurities of more than 0.1% by weight of copper and of more than 0.1% by weight of iron lead to deteriorated mechanical properties and especially enhance intercrystalline corrosion. Thus, these metals and other impurities should be present only in the usual unavoidable amounts.

Although the contents of indium, calcium, titanium and manganese can be increased in principle, this would only result in an unnecessary increase in price of the material without noticeably further improving the properties.

The strips and plates which can be used as constructional zinc can be prepared by the usual casting-and-rolling process. In principle, all zinc grades according to EN 1179 can be used, the zinc grade Z1 being preferred because it contains relatively little lead, iron and copper.

Aluminum as an alloy component is preferably employed in the grades according to EN 576.

CLAIM:

(amended December 8, 2000)

1. Use of zinc alloys containing from 8 to 15% by weight of aluminum and optionally further alloy components, namely

from 0.002 to 0.4% by weight of titanium; and/or

from 3 to 100 ppm of boron; and/or

from 3 to 50 ppm of magnesium;

and optionally

from 0.002 to 0.04% by weight of indium; and/or

from 0.002 to 0.04% by weight of calcium; and/or

from 0.05 to 0.8% by weight of manganese; and

from 3 to 100 ppm of carbon, from 2 to 500 ppm of vanadium, from 2 to 500 ppm of silicon and/or from 2 to 500 ppm of nickel; but containing less than 0.1% by weight of copper and less than 0.1% by weight of iron, and lead only as unavoidable impurities;

for the preparation of strips and plates which can be used as constructional zinc and are prepared by the casting-and-rolling process.

DECLARATION  
AND POWER OF ATTORNEY  
U.S.A.

ALL PATENTS, INCLUDING DESIGN  
FOR APPLICATION BASED ON PCT; PARIS CONVENTION;  
NON PRIORITY; OR PROVISIONAL APPLICATIONS

FOR ATTORNEYS' USE ONLY

ATTORNEYS' DOCKET NO.

011172 US  
1 of 2

As a below named inventor, I declare that my residence, post office address and citizenship are stated below next to my name, the information given herein is true, that I believe that I am the original, first and sole inventor (if only one name is listed at 201 below), or an original, first and joint inventor (if plural inventors are named below at 201-203, or on additional sheets attached hereto) of the subject matter which is claimed and for which patent is sought on the invention entitled:

Use of Zinc Alloys

which is described and claimed in:

☒ PCT International Application No. PCT/EP99/08664

filed November 11, 1999

☐ the attached specification

☐ the specification in application Serial No.

filed

(if applicable) and amended on

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(d) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

198 52 987.2

Germany

17/11/1998

Priority Claimed

☒ Yes

☐ No

(Number)

(Country)

(Day/Month/Year Filed)

☐ Yes

☐ No

(Number)

(Country)

(Day/Month/Year Filed)

☐ Yes

☐ No

(Number)

(Country)

(Day/Month/Year Filed)

☐ Yes

☐ No

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

Application No.

Filing Date

Application No.

Filing Date

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)

(Filing Date)

(Status: patented, pending, abandoned)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys (Registration No. ) to prosecute this application, receive and act on instructions from my agent, and transact all business in the Patent and Trademark Office connected therewith. HARVEY B. JACOBSON, JR. (20,851); JOHN CLARKE HOLMAN (22,769); MARVIN R. STERN (20,640); ALLEN S. MELSER (27,215); MICHAEL R. SLOBASKY (26,421); JONATHAN L. SCHERER (29,851); IRWIN M. AISENBERG (19,007); WILLIAM E. PLAYER (31,409); YOON S. HAM (45,307) and NATHANIEL A. HUMPHRIES (22,772)

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\*Inventor(s) name must include at least one unabbreviated first or middle name.

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				ZIP CODE
				47139

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under section 1001 of Title 18 of the United States Code; and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201\*

SIGNATURE OF INVENTOR 202\*

SIGNATURE OF INVENTOR 203\*

DATE 22nd May 2001

DATE 22nd May 2001

DATE 22nd May 2001

☐ Additional inventors are named on separately numbered sheets attached hereto.



**JACOBSON HOLMAN PLLC**  
**ADDITIONAL INVENTORS**

\* Inventor(s) name must include at least one unabbreviated first or middle name.

204	FULL NAME OF INVENTOR	FAMILY NAME <u>Wisniewski</u>	GIVEN NAME <u>Jürgen</u>	MIDDLE NAME	
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	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
207	FULL NAME * OF INVENTOR	FAMILY NAME	GIVEN NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
208	FULL NAME * OF INVENTOR	FAMILY NAME	GIVEN NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
209	FULL NAME * OF INVENTOR	FAMILY NAME	GIVEN NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
210	FULL NAME * OF INVENTOR	FAMILY NAME	GIVEN NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
211	FULL NAME * OF INVENTOR	FAMILY NAME	GIVEN NAME	MIDDLE NAME	
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 204 *	SIGNATURE OF INVENTOR 205 *	SIGNATURE OF INVENTOR 206 *
<u>X Jürgen Wisniewski</u>		
DATE <u>22nd May 2001</u>	DATE	DATE
SIGNATURE OF INVENTOR 207 *	SIGNATURE OF INVENTOR 208 *	SIGNATURE OF INVENTOR 209 *
DATE	DATE	DATE
SIGNATURE OF INVENTOR 210 *	SIGNATURE OF INVENTOR 211 *	
DATE	DATE	